

Reviews and Bibliographical Notices.

I.—KUSSMAUL: THE DISORDERS OF SPEECH.

HANDBUCH DER SPECIELLEN PATHOLOGIE UND THERAPIE.
Herausgegeben von Dr. H. Von Ziemssen. ZWÖLFTER
BAND, ANHANG. DIE STÖRUNGEN DER SPRACHE. Ver-
such einer Pathologie der Sprache von Dr. Adolf Kussmaul,
Professor in Strassburg. Leipzig, 1877. (*The Disorders of
Speech, etc.*) 300 pages.

This work appears to us to be one that it is somewhat difficult to adequately notice in a JOURNAL like ours. Its subject is the disorders of a function which from its importance has intruded an irregularity into the otherwise usually pathological classification of nervous diseases. This special study, moreover, from the intimate relations it has demonstrated to exist between the most special and important mental manifestations and processes, and our physical system, is one of surpassing interest, not only to the physician but also to the philosophical psychologist. It is not surprising, therefore, that in such an extended monograph, such as the one before us, the author should deviate somewhat from the ordinary course in medical text-books, and attempt to enter upon and discuss the higher and more abstract questions suggested by the theme. Thus in the present volume we find a very considerable space devoted to the physiological psychology of speech, its origin and earlier development, all preceding the real subject of the work as a medical treatise—the disorders of this function. This materially adds to the completeness of the monograph, but it appears to us to have some disadvantages. Thus it brings in some speculative questions in relation to thought and speech, and their mutual interdependence. Probably as much can safely be said of some of the philological bearings of the ideas here advanced, but we cannot discuss either of these points adequately in the present notice.

The first fifteen or sixteen chapters are mainly given to the discussion of the nature of speech, its origin, psychology, etc.,

and, therefore, are included under the above-mentioned head as less medical than linguistic in the character of their contents. There is much of interest, however, in the author's method of treating the subject, that it will not do to pass over unnoticed. While he studies the function of speech in these chapters mainly in its psychological relations, its origin, connection with ideas, etc., he still treats the subject more or less from a physiological point of view, and moreover, touches to some extent upon its pathological conditions. Thus in the eighth chapter is given a general statement of the varieties of the general disorders of the means of the expression of our thoughts, followed in the ninth by one of those of diction and articulation in the more restricted sense. While we observe that he uses the term aphasia in its general sense throughout the volume, probably because of its customary usage, he endorses the objection of Finkelnburg, that it is not a sufficiently comprehensive term to properly include all the disorders of expression to which it is applied, but instead of the word *asymbolia*, proposed by that author, Prof. Kussmaul suggests that *asemia* of Steinthal be used instead, as of still less restricted signification. Thus we may have, he says, *asemia verbalis*, *graphica* and *mimica*, and as varieties, *asemia paraphrasica*, *paragraphica* and *paramimica*, and may speak of an *asemia expressiva* or *perceptiva* according as the ability to make or understand the sign is meant. Then he classifies the disorders of speech proper, or lalopathies, into those of articulation and diction as follows, those of the former as dysarthrias, subdivided into those of the external organs of speech, (*dyslalia*) and the essential or central dysarthrias, according as the disturbance is merely functional or is connected with organic lesions of the nerve centres. Diction is a mixed sensory-intellectual act, in which the words are not only connected with ideas, but are grammatically combined, and to its disturbances he gives the name dysphasias. This is not a complete classification, nor is it the one followed throughout in the book, but it is here reproduced as one that is rather comprehensive and philosophical.

After noticing the relation of speech to memory and the forms of amnesic aphasia in a brief and general way, and giving some space to the development of language in infancy, the author comes in his fifteenth chapter to the discussion of the necessary relations of the various special senses to speech. In this, the most striking example is, of course, the well-known case of Laura Bridgeman, narrated by her instructor, Dr. Howe, one of the most suggestive cases ever published. The final conclusion which this case teaches, and which the author admits, is that the tact and muscular senses are the only ones essential for the formation of a comprehensible language, and the development of the intelligence, and therefore the only absolutely necessary reflex sources of expression, a fact that has been frequently ignored or overlooked by writers on mental philosophy. In

normal individuals, however, there is no question but that the senses of hearing or sight are essential to perfect speech. The imitative articulation of infants first learning to use their vocal organs, unlike the echo-speech in certain forms of disease, and the verbal articulation of parrots, is not classed by Prof. Kussmaul as a simple auditory reflex, the sound exciting the proper centre at the base of the brain, and reflexion taking form of the reproduction of the sound. He discusses this question physiologically, reviewing the evidence pro and con as to the possibility of the act being performed without the intermediation of the higher organs of the brain, and concludes as follows: "Only one clinical proof can be given for the, to us altogether improbable hypothesis, that the imitative reflex speech is performed directly and solely between the auditory nerves and the motor nerves of articulation in the basal centre. After a complete destruction of the voluntary motor routes in the hemispheres, including the internal capsules, words must still be spoken. Until this proof is established, we shall still believe that imitation is always a function of the cerebrum." That the author is correct in this decision, we presume few will deny; it is, indeed, to us somewhat remarkable that speech should be classed in any usual sense among the reflex acts. This cannot be the case by any means in infants, unless we place all their early indications of intelligence among the reflexes. In the case of the interjections, oaths, etc., which are sometimes readily uttered by aphasics, who have completely lost the faculty of speech, it may be said that they belong in a certain sense to the reflexes of education or habit, but as such it is hard to prove that their reflex centre is situated anywhere below the cerebrum. The theory of Hughlings Jackson, that this automatic articulation is a function of the right hemisphere is very properly rejected by our author, not so much on the grounds, however, of its needlessness, as we would prefer, but because of the evidence we have that emotional manifestations proceed from either hemisphere. That of Jacoud, that a basal centre was alone enough to account for them, when we consider the complex phrases and even whole sentences that are sometimes thus ejaculated appears also improbable. It seems to us, indeed, to be only different in degree from ordinary speech, and in the fact that the special and stronger stimulus in this case is an emotional and not so much an intellectual one. In ordinary talking, the ideas are all we are conscious of, the words usually come of themselves, and their formation, which was once a task of conscious intellection, takes place unconsciously and, as we might even say, reflexly. But one would scarcely be tempted to place the centre for this reflex excited by ideas in the medulla, or base of the brain, nor does it seem right, unless we are, like Carpenter, Vulpian, and some others, inclined to make the medulla the seat of the emotions, to refer these ejaculatory articulations to that portion of the nerve centres. So, also, in respect to the musical expression of which some

aphasics are capable, in some cases the rhythm even carrying with it the words of a piece of poetry. In the same way some patients have been able to repeat words in connection with others and in short sentences, that they were unable to repeat alone, this being only a pathological example of what occurs normally in almost every one's experience, but which is interesting in this connection as indicating, as it appears to us, a higher situation of this, as it were reflex, centre for speech than the medulla, where its purely mechanical centre must be located. This hypothesis of a superior automatic phono-motor centre above the mechanical centres of speech, has been some what developed by Onimus, in an interesting paper published in the *Journal de l' Anatomie et de Physiologie*, 1873, and a translation of which appeared in this JOURNAL for April, 1874. This paper seems not to have been known to Prof. Kussmaul, as he makes no mention of it, nor does he follow out to any extent its line of thought.

That the centre for articulation, or the purely mechanical part of speech is situated in the basal portions of the brain is proven sufficiently, not only by physiological, but also by pathological evidence. That it is in the medulla is supported by the facts that in that region are the nuclei of the various nerves supplying the parts employed in articulation. But the view that the cerebellum has any part in these disorders, as held by Jaccoud and Luys, our author considers rests upon no secure foundation, and he briefly reviews the facts bearing on this question in support of his position. As to the part played by the higher ganglia, there is too little positively known of the course of the nerve tracts to exactly state the mechanism. Some points, however, may be regarded as established. Thus, it is a common observation, that the dysarthric complications are more pronounced and enduring in cases of right hemiplegia from lesions in those parts than in those where the paralysis is on the left side of the body. The corpora quadrigemina may be said to have no special connection with articulate speech, though their importance from their optic connections, to other methods of expression is, Prof. Kussmaul thinks, sufficiently obvious. As to the thalamus, the evidence is not so strong in any direction, but from some observations it appears probable that disturbances of articulation may be caused, perhaps, indirectly by lesions of this ganglion. The relations of the corpus striatum to articulate speech are more evident, but still as our author admits, clinical proofs are not yet sufficient to enable us to form perfectly satisfactory conclusions, as to the relations of the corpus striatum to the basal centre for articulation. "Only this much is certain, that lesions of the corpus striatum render the articulation stammering to the point of unintelligibility, or may altogether suppress it, and this disturbance of function is the more sure and considerable, the more extensive the lesion, especially on the left side. But the distinction of the effects

from lesion of the gray or white substance, and the respective parts they take in the function, remains a difficult question for future decision." The theory of Broadbent, that the formation of words and word groups takes place in the corpus striatum, is hardly much favored by Prof. Kussmaul, and, indeed, it appears not probable when we consider the complexity of this operation in most cases. Still, as he states, it may have a part in the formation of syllables, and the vocalization of consonants, and, in short, in whatever may be the basal mechanism of speech. It is, he holds, the uppermost brain tract injuries of which can lead to simple dysarthric alterations of speech, the dysphasic symptoms appear when injuries are received in the still higher regions of the brain.

In the twentieth chapter, there is a rather lengthy psychological digression, as it appears to us, which we will notice, since the author's views are perhaps not those most generally accepted either by metaphysicians or physiologists. They are not new, however, but have been advanced, perhaps, in a somewhat different form, previously. The question, where are the forms of speech elaborated in the brain, follows naturally that as to what are the sensory routes by which the external excitations reach our mental laboratory, and react in the form of spoken or written language. That is, where are the spoken or written signs for ideas elaborated, and this is hard to consider separate from the other question, where are these forms understood as signs of ideas? The first question is easily disposed of, we really know nothing of the higher course of the fibres from the optic and acoustic nerves. But we know from pathological evidence that these routes may be intact, and yet the power of appreciating words as signs or symbols may be lost, thus indicating that the cerebral regions for the perception of sounds or signs are not the same as those for the ideas they represent. This naturally brings in the question as to the seat of the psychic functions and of consciousness which our author discusses at some length. His psychology is much the same as that of Wundt, and he adopts what is possibly a necessary outcome of those views, the opinion that the psychic (*seelische*) functions are not limited to the cerebrum, but that other portions of the nervous system are the organs of the mind. This view he supports not only on the physiological grounds adduced by Pflueger and Hammond, but by the theory of the unconscious consciousness of which Wundt makes so much in his physiological psychology, though he does not directly refer to that author in this connection. We have not the space here to give the reasons why we disagree with our author in this regard, the subject is too extensive, and, as we have said, his remarks here appear to us like something of a digression from the proper theme of his memoir. We must leave its further discussion till we take up in some future number of this JOURNAL, the physiological-psychological theories of a modern German school.

We will pass over the chapters upon cerebral localizations, and the remarks on the history of the localization of the function of speech in a special region of the brain, the literature of both of which subjects must be familiar to our readers. Prof. Kussmaul concludes that while the third frontal convolution is not the only cortical region concerned in speech, still it has a rather more important connection with this function than other parts. That the left hemisphere is most generally the one that has to do with this faculty he admits, and accounts for the fact by the general right-handedness of individuals indicating the greater functional ability for most purposes of the left hemisphere. The only suggestion he offers to account for this is taken from Ogle who thought that the greater blood supply of the left hemisphere might be the cause of this difference, and who it is known, made some investigations on this point. He does not quote, nor seem to be aware of the very elaborate memoir of De Fleury upon this subject. The final conclusion he appears to reach from the study of the reported cases, is that the third frontal convolution appears to be concerned in the combination of speech, that in ataxic aphasia the anterior portion of the hemisphere, either alone, or together with the posterior region, is almost invariably affected, while in purely amnesic aphasia, sometimes one sometimes the other of these tracts appears to be the seat of the lesion. Beyond this we are not in any position to form even approximately correct judgments of the localization of speech in the cortex.

We have already given the general classification proposed by our author in his ninth chapter. In the twenty-fourth he lays down his clinical classification of aphasic disorders, in the usual and more restricted sense of the word, comprising the dysphasias of the former plan. These he divides into two great classes, the dysphasias and the dysphrasias or dyslogias, the latter including the disorders of speech due secondarily to disease, affecting the intellectual functions. The first of these he divides in a general way into the following:

1. Ataxic aphasia or inability in the motor co-ordination of words. This really is only a cortical mechanical trouble, a verbal anarthria, and as Steinthal correctly says, a true dysphrasia, though here included.

2. Amnesic aphasia or inability to remember words as acoustic sound-complexes.

3. Verbal deafness (*Worttaubheit*) or inability to understand words as before, notwithstanding the retention of normal hearing and a fair degree of intelligence.

4. Paraphasia or the inability to rightly connect words with ideas, so that instead of the proper term one of the opposite signification may sometimes be employed.

5. Agrammatismus and akataphasia, or inability to grammatically form words and arrange them in sentences.

These, taken in a sense so as to include the corresponding

disorders in writing, signs, etc., as well as in speaking, comprise all the clinical forms of aphasia, in the commonly employed signification of the word, but not, of course, all cortical lesions of speech. Prof. Kussmaul mentions a number of these which he treats more fully in later chapters of the book. Such are retardation of speech, and its acceleration, sometimes to a very remarkable extent rendering it even unintelligible, peculiar modulations in speech, aphasic stuttering, and the inability to manage long and many syllabled words as a whole and at once.

Another point to be borne in mind, as a matter of course, is that these varieties of aphasic disorder are not always well marked and distinct. Thus amnesic and ataxic aphasia include each other to a certain extent, and paraphasia is, as Bastian says, an ataxic disorder of diction.

We can pass without lengthy notice the parts in which simple ataxic and amnesic aphasia are discussed, since these must be more or less familiar to the readers already, and we do not find much to call for special mention in the author's very excellent treatment of his subject. The curious conditions, however, which he distinguishes under the names of "*Worttaubheit*" and "*Wortblindheit*" are worthy of particular notice. In these the centripetal routes of communication between the ideational centres and the external world, are, or appear to be, interrupted, while the centrifugal routes of expression may seem to be comparatively only slightly embarrassed. The patient may retain a fair degree of intelligence, and be able to express himself more or less perfectly in language, have perfect sense of hearing, and be able, as in cases here reported, to distinguish the quality and tones of sounds, and yet the words of others in the same language as he himself uses, be utterly unintelligible to him. There are various curious modifications of this condition illustrated by cases given, collected from various sources by the author; they may be able to converse, but though they distinguish the forms of letters, they lose entirely the power to read, or they may also lose the ability to distinguish numerals, etc. It would seem that the special apparatuses, in the brain for these particular faculties, had alone suffered. It might seem that when the centrifugal routes of expression were still nearly intact, and the lesion affected only the perceptive channels, that aphasia was hardly the correct term, notwithstanding the disturbance was still of the same general class. These interesting phenomena need still further study, and their treatment here is by no means exhaustive. On page 182, Prof. Kussmaul presents a schematic drawing, representing his ideas of the routes and centres employed in speech, with his explanations accordingly of the different varieties of disorder of the functions. But it would seem from the clinical records of disorders of speech, that almost every possible interruption of communication may take place, pathologically, along these routes.

The numerous cases of functional and hysterical aphasia that

are met with in almost every extensive practice, are briefly noticed in the thirty-first chapter. He does not, however, attempt to explain at any length their pathology. He merely says that almost every possible morbid condition of the brain may cause aphasia, if the routes and centres for speech are either directly injured or if their functions are indirectly and temporarily disordered from pressure, ischæmia or collateral hyperæmia, or perhaps from reflex irritation and irradiation. One remark of the author's in this connection' appears to us to require explanation. He says that in cases of functional or hysterical aphasia, the words are intact, as is likewise the connection between the words and ideas, but that the interruption is somewhere between the word centre and the muscular apparatus of speech, that the general cortical and infra-cortical excitation, by means of which the conception is translated into words, is too weak, and that the so-called "moral treatment" is efficacious in some of these cases by supplying or reinforcing this psychic excitation. This is, it appears to us, rather too general a statement, without more qualifications than it here receives, we have met with cases of what might well be called transient hysterical aphasia, occurring from uterine irritation in neurotic females, in which the disorder seemed to affect higher cerebral centres than are here admitted.

We are compelled to pass the remaining portions of this work, those in which are described the various dysphasic or dyslogic disorders of speech, and its mechanical derangements from lesions or deficiencies of the more peripheral organs concerned in its production with only bare mention. We can honestly refer the reader to this volume, as the most thorough and complete monograph of the subject that has as yet appeared. While the tendency of the author to amplify on certain points, may possibly be criticised, it must be admitted that this could hardly be avoided, and that there is a certain advantage in having these subjects viewed from their physiological side, by so eminent an authority as Prof. Kussmaul. And, as we have said before, these parts materially add to the completeness of the work.

II.—THE FUNCTIONS OF THE BRAIN.

THE FUNCTIONS OF THE BRAIN. By DAVID FERRIER, M. D.
With Numerous Illustrations; P. 323. G. P. Putnam's
Sons, New York.

(CONTINUED FROM THE JANUARY NO.)

After a consideration of the functions of the semi-circular canals, and the maintenance of equilibrium, Dr. Ferrier passes to a study of the functions of the optic lobes.